other material, mostly carbon, in which it is not only lost, but deodorized. The breeze and ashes find a ready sale among the brickmakers, but there is still a better outlet for them. By mixing them with pitch they can be pressed into briquettes and used for steam raising. It can scarcely be contended that these briquettes are equal to those made from fresh Welsh coal, but they are very fair, and can be sold at a reasonable price. The liquid pitch incloses any objectionable elements they may contain, and the result is that they are inodorous. Another material of value found among dust is paper. Immense quantities of this are collected, and can be used over again for the manufacture of common brown paper for wrapping parcels. After being dried to remove the dust, and passed through the beaters to reduce it to pulp, it becomes as clean and as sweet as when it came home from the grocer's or draper's. Straw can be similarly utilized for straw-boards.

We recently had an opportunity of inspecting the company's premises, and feel sure that a short account of them will interest our readers. It is an important feature of the process that it is almost entirely mechanical, as nine-tenths of the material is never touched by hand. The dust as it arrives is tipped into a rotating cylindrical sieve. This runs on a horizontal axis, and is twelve feet in diameter by twelve feet long. The meshes are formed of bars three inches apart, and the progress of the tailings is regulated by an internal worm, which obliges them to make about three circuits of the screen before they can escape. A large exhaust pipe, operated by a powerful fan, draws all the floating dust and small particles forwards, and delivers them into the closed ashpit of a steam boiler. The tailings are mostly bulky articles; the paper, rags, and straw usually roll into balls, although a good deal of small escapes through the meshes. Each thing that comes out is thrown on to its proper heap, while the rubbish for which no use can be found is sent to be ground under edge runners, as will be explained presently.

The articles that pass through the meshes are raised by an elevator, and delivered to a second rotating screen fifteen feet long, six feet in diameter, and an inch and a half mesh. The tailings from this are first subjected to a blast, to take out light paper and straw, and are then dropped on to a revolving sorting table, fifteen feet in diameter. A boy sits beside it, and picks out every thing of value as it passes him, such as bottles, glass, iron, bones, etc. The rubbish, such as animal and vegetable refuse and broken crockery, he allows to go past him to the grinding mill. Here every thing for which no use can be found is reduced to a dry powder, which appears able to absorb all the offensive elements and render them sweet. There are no heaps labelled "miscellaneous" in these works to distract the manager and breed a nuisance. Every thing that is doubtful goes into the mill, which is the *pot au feu* of the establishment. When it comes out it is no longer recognizable. The mixture is carried back and put into the first screen to be again sorted.

Every thing that will pass through an inch and a half mesh falls from the second screen on to a travelling band, which delivers into a third screen fifteen feet by six feet, covered with two meshes, half an inch and three-eighths of an inch. What passes through the former is called ashes, and through the latter breeze. The tails go for steam generating. The ashes are used to mix with clay for brickmaking, and the breeze for burning in the clamps, unless, as indicated above, they are pressed into briquettes, which, of course, fetch a better price. The ashes and breeze pass over a fine shaking-screen, which takes out every thing below an eighth of an inch. This is valuable as manure, being the greater part of the animal and vegetable matter ground up in the mill.

Having traced the dust through its entire passage we must return and notice some of the tailings. As we have already said, every thing for which an immediate use cannot be found is destroyed. At present straw falls into this category, although the success of foreigners in the manufacture of straw-boards leads to the hope that that manufacture may be eventually established here. The straw is all burnt with special precautions to render the smoke inoffensive. An externally fired cylindrical boiler has two grates; on the larger of these the straw is burned, while on the smaller there is a breeze fire through which the gases from the straw are passed to complete the combustion. The paper is re-made on the premises. This seems a curious industry to carry on in Chelsea, but a well has been sunk into the gravel, and an ample supply of water has been obtained to keep three beaters and one paper machine at work. This is the most valuable by-product of all. The special value of the process is, however, that it enables the paper to be cleansed immediately, instead of being retained until a market can be found for it.

The works naturally consume a good deal of steam, particularly for the paper-making, and this accounts for much of the fine fuel. Indeed, it is conceivable that in any general extension of the system it might be worth while to use all the fuel on the premises in winter for the production of electric lighting currents. The total cost of handling would thus be avoided, and possibly a saving of the ratepayers' money effected. To prevent the evolution of smoke and any nuisance that might arise from the nature of the fuel, the five boilers of the works have their smoke drawn by an exhaust fan through scrubbers, in which it is thoroughly washed before it is delivered into the air. The three locomotive boilers are worked with forced draught, by which all the floating dust collected from various parts of the works is thoroughly burned up.

The works have already been in operation for nearly two years, and during that time they have grown up to the present state as the results of prolonged experiments, in the course of which five thousand loads have been treated. Difficulties, often quite unexpected, have been found and met, and new devices have had to be produced as time went on. At present the works are dealing with thirty-five loads a day from Kensington and Westminster parishes, and are on a sufficiently extensive scale to show what the process will do. They are exciting a great amount of attention all over the country, and many parishes are watching them with interest. The disposal of dust is undoubtedly one of the greatest problems of the day, and the process patented by the Refuse Disposal Company solves the question from a sanitary point of view, but of course it would want an examination of their books to decide the exact economic value of the process.

HEALTH MATTERS.

Pathogeny of Diabetes.

BOUCHARD has stated that there are no fewer than twenty-seven theories of the cause of diabetes. None are entirely satisfactory. The most important fact discovered in recent years, says the *British Medical Journal*, is that diabetes follows extirpation of the pancreas in animals, and numerous clinical observers have since then noted pancreatic disease in conjunction with glycosuria. V. Mering and Minkowski, with most praiseworthy scientific reserve, have abstained from formulating any theory to explain the undoubted fact they have put upon record, and Lépine has discovered an additional fact in relation to pancreatic extirpation and diabetes, which must be taken into account when the true explanation of these phenomena is forthcoming. Healthy blood possesses what he terms glycolytic powers. Fresh blood contains a certain percentage of sugar. If the same blood be allowed to stand at the body temperature for an hour before it is examined, a very considerable portion (20 to 40 per cent) of this sugar has disappeared. This number (20 to 40) may be taken as the glycolytic power of healthy blood.

It is considered that this sugar-destroying power is due to a ferment present in the corpuscles, but especially in the white corpuscles, as the glycolytic power of the chyle is as great as that of the blood, and the portions of the blood richest in leucocytes are richest in the ferment, which may be dissolved out from them by salt solution. In cases of diabetes the glycolytic power of the blood falls to 5, 2, or even 1. In animals without a pancreas there is a similar drop. The pancreas thus appears to be the chief source of the ferment.

Lépine believes that the activity of a pancreatic cell is bipolar; by its internal extremity it pours the pancreatic juice into the ducts of the organ, and by its basal extremity it pours into the venous blood and lymph the glycolytic ferment. The absence or

diminution of the sugar-destroying power of the blood dependent on pancreatic extirpation or disease is thus a factor, and perhaps an important one, in the causation of an over-abundance of sugar in the blood, and will certainly have to be reckoned with before the true pathogeny of diabetes is understood.

Effects of Tuberculine on Monkeys.

M. Henocque has recently tried the effect of tuberculine on a monkey which presented no symptoms of pulmonary phthisis. Two days after the first injection, according to the *British Medical Journal*, the animal, which had exhibited the characteristic re-action, presented dullness and a few *râles* at the right apex. After the third injection the dullness was more marked on the right side, and began to be perceptible at the left apex. Soon all the symptoms of acute phthisis manifested themselves, with intense fever, the animal dying ten days after the last injection, after losing a tenth of its weight during that time. The total amount used was six milligrammes of the diluted fluid. On post-mortem examination, four tuberculous nodules of the size of a pea were found in the right lung, and caseous pneumonia involving two-thirds of the organ in the left. In both cases the tuberculous lesions were surrounded by a zone of very intense red hepatization. Pieces of the caseous tissues were injected into two guinea-pigs, in one after mixture with sterilized water, in the other with diluted tuberculine. Both animals showed signs of cutaneous and glandular tuberculosis.

A New Antiseptic.

At the Académie de Médecine, Paris, on April 28, M. Polaillon read a paper contributed by Dr. Berlioz of Grenoble on a new antiseptic agent called "microcidine," which is composed of seventy-five per cent of naphtholate of sodium and twenty-five per cent of naphol and and phenyl compounds. According to the *Lancet*, it is a white powder obtained by adding to fused β-naphthol half its weight of caustic soda, and allowing the mixture to cool. It is soluble in three parts of water, and the solution, which is cheap, is said to possess considerable antiseptic powers, without being toxic or caustic, or injurious to instruments or linen. The antiseptic properties of microcidine, while inferior to those of corrosive sublimate or naphthol, surpass those of carbolic and boracic acids ten and twenty times, respectively. Microcidine is eliminated by the kidneys, and is antipyretic. M. Polaillon has experimented with this new agent largely as a dressing to recent and other wounds, utilizing as a dressing, after a preliminary cleansing of the raw surface with a three per cent solution, gauze soaked in the same and covered with a layer of oil silk and a thick pad of cotton-wool. The results are reported to have been excellent.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

Electric Storms and Tornadoes in France on Aug. 18 and 19, 1890.

ON the very day of the tornado at Wilkesbarre, Penn., last year, another, almost unprecedented, was raging at St. Claude, France, near the Swiss frontier, south-east from Paris. On the previous day electric storms and very strong wind-rushes, perhaps tornadic in their character, devasted other portions of France. In the reports of these violent storms there is a continual mention of their similarity to the tornadoes in this country. Quite full accounts by several prominent physicists have appeared in *Comptes Reudus*, and these will be freely quoted from.

On Aug. 18, 1890, at 7.15 P.M., a *trombe* (this word is used for water-spout usually, and seems to indicate, on land, a funnel cloud but of somewhat narrower dimensions than those in this country) struck the commune of Piré, situated in Ille-et-Vilaine, and about 180 miles a little south of west of Paris. It moved to the north-east, and next struck Domagné, 3.5 miles from Piré. The length of its track was about 10 miles, and width 650 to 870 yards. Its velocity was almost 37 miles per hour.

A second *trombe* struck Dreux, situated 45 miles west of Paris, at 10.25 P.M.; then it passed north-east to St. Thibault, and on through the Blaise valley to Fontaine, about one mile from Dreux, It then turned to the left in the valley of the Eure River, and again turning to its former course, it struck Brissard.

On the next day a *trombe* struck St. Claude, at the eastern boundary of France, at 7.37 P.M. It moved north-east 15.5 miles to Brassus, then to Bris-d'Amont, and to the station Croy, which it reached at 8.37 P.M. The velocity was 42 miles per hour, and the width of destruction 220 to 1,100 yards.

These facts show clearly that there were several violent storms on the 18th running in parallel lines, beginning toward the west early in the evening and occurring at points farther east later on; that is to say, the several appearances near Piré and Dreux were separate occurrences, and the violent storm did not go from one to the other, but each devastated its own narrow strip. It will be seen that this bears a most remarkable resemblance to the action of tornadoes in this country.

At Piré the *trombe* was investigated by M. G. Jeannel. There was an apparent whirlwind, transported parallel to itself, and turning counter-clock-wise, as shown by the fallen trees. The first thrown down were from the south-east, the next from the east, and so on to the north-west. The greater damage was on the right hand of the track. The velocity of gyration was great and that of translation relatively much less.

The roofs damaged were peculiar. On the right of the path those facing north were carried away, while those facing south were unharmed; on the left of the track just the reverse was true. During the whole time the lightning was continuous. The odor of ozone was noted at different places. At Reinou a woman tending a cow, grazing in the meadow, saw her enveloped in violet flames. These were so intense that the woman, from fright, covered her face with her handkerchief. A moment later the wind struck down every thing.

At Domagné Dr. Pettier suddenly heard an extraordinary indefinite roaring. He rushed toward the garden, where the firs were being plucked up. At the gate he felt a kind of pressure from above; he noticed an unusual smell of ozone; then he felt himself raised up, and this not by the wind, for it was calm, but as though by some invisible force. On many trees the foliage was scorched. About a mile west of Domagné, hail of the size of a walnut fell to a depth of over three inches, covering the ground.

At Dreux the report was by M. Bort. At 10 P.M. a great cumulo-nimbus thunder-cloud was seen to the south-south-west of the town. On its upper part a very brilliant plume of sparks was directed toward heaven. In this cloud the lightning was incessant and the thunder loud. After some hail had fallen, at about 10.25 P.M., a loud roar was heard, like that of a train entering a tunnel, and in less than a minute the storm reached the town. It blew off the tiles, plucked out the trees, and destroyed many houses. At the moment of the passage the sky was on fire, and some persons saw a cloud which reached the height of a house. Reaching the Blaise valley it plucked up many poplars, and left them lying generally from south-south-west to north-north-east. In the environs of Fontaine many trees were uprooted. At Brissard the hurricane made a passage through the western part of the village, destroying twenty houses. At another point most of the trees lay from south-west to north-east, but there were many, 220 yards from the first, that lay in an opposite direction.

Lightning strokes were very rare, because no traces were found upon trees, and no houses were fired. There was a remarkable exception, however, in the Vivien house, built solidly of brick, which had traces of electric discharges. Some window-panes were pierced by circular holes, and these holes had a sharp edge on the outside. On the inside the edge had suffered a beginning of fusion, which had rounded it off. The damage was reported at $300,000 in Dreux, and one person was killed. At the instant of the passage all the gas-lights were extinguished, and it is suggested that "this indicated a rarefaction of the air near the centre of the whirl." By the synoptic charts it appears that the passage of this *trombe* was coincident with the existence of a secondary